

CLAIMS

1. An apparatus for mixing a fluid and medicament within a medicament delivery device, comprising:

a pressure member having a pressure member outlet, said pressure member having a first and a second position;

a valve having an outlet and an inlet in fluid communication with said pressure member outlet;

a medicament dosing member having a chamber therein including a chamber inlet in fluid communication with said valve outlet and chamber outlet, a medicament in said chamber and membranes sealing said chamber inlet and outlet;

whereby transition of said pressure member from said first position to said second position generates fluid under pressure at said pressure member outlet and opening of said valve releases fluid under pressure into said chamber inlet, breaching said membranes and expressing said medicament in said chamber through said chamber outlet of said medicament dosing member.

2. The apparatus as defined in Claim 1, further comprising a penetration member wherein breaching of said membranes is by application of said penetration member, and said penetration member penetrates said membranes.

3. The apparatus as defined in Claim 1, further comprising a cooperative stop member, wherein said cooperative stop member retains said pressure member in said second position.

4. The apparatus as defined in Claim 3, wherein said valve is manually releasable.

5. The apparatus as defined in Claim 1, wherein said pressure member is a collapsible bulb.
6. The apparatus as defined in Claim 1, wherein said pressure member is a syringe.
7. The apparatus as defined in Claim 1, wherein said medicament is aerosolizable.
8. The apparatus as defined in Claim 1, wherein said medicament is a powder.
9. The apparatus as defined in Claim 1, wherein said delivery device includes a medicament cartridge located in said chamber of said medicament dosing member having a passage therethrough including an inlet in fluid communication with said chamber inlet and a passage outlet, said medicament in said passage of said medicament cartridge and said membranes sealing said passage inlet and outlet of said medicament cartridge.
10. The apparatus as defined in Claim 9, wherein said membranes are burstable and formed of a polyolefin having a burst pressure of less than 10 atmospheres.
11. The apparatus as defined in Claim 10, wherein said polyolefin burstable membrane seals said passage outlet of said medicament cartridge.
12. The apparatus as defined in Claim 9, further comprising a penetration member wherein breaching of said membranes is by application of said penetration member, wherein said penetration member penetrates said membranes.
13. A medicament respiratory delivery device comprising:

a housing having a chamber therein, said chamber having a chamber inlet and a generally co-axially aligned chamber outlet;

a medicament cartridge located within said chamber having opposed ends, a passage through said cartridge through said opposed ends generally co-axially aligned with said chamber inlet and chamber outlet of said housing, a medicament in said passage and pierceable membranes sealing said passage at said opposed ends of said cartridge;

a manually actuatable fluid delivery device having a fluid delivery device outlet in fluid communication with said chamber inlet for delivery of fluid under pressure to said chamber;

a manually actuating piercing element to selectively pierce at least one of said pierceable membranes; and

a manually actuatable valve located between said fluid delivery device outlet and said chamber inlet having a valve inlet in fluid communication with said fluid delivery device outlet and a valve outlet in fluid communication with said chamber inlet;

whereby actuation of said manually actuatable fluid delivery device delivers fluid under pressure to said valve inlet and opening of said valve delivers fluid under pressure to said chamber inlet, and subsequent activation of said piercing element breaches said pierceable membranes of said medicament cartridge and expressing said medicament through said chamber outlet.

14. The medicament respiratory delivery device as defined in Claim 13, wherein said medicament respiratory delivery device includes a stop member fixing

said manually actuatable fluid delivery device following delivery of fluid to said valve inlet and maintaining fluid pressure at said valve inlet prior to opening of said valve.

15. A medicament delivery device, comprising:

a medicament dosing member including a chamber having a chamber inlet and a chamber outlet generally co-axially aligned with said chamber inlet;

a medicament cartridge located within said chamber having opposed ends, a passage through said cartridge through said opposed ends generally co-axially aligned with said chamber inlet and chamber outlet of said medicament dosing member, a medicament in said passage and breachable membranes sealing said passage at said opposed ends of said cartridge;

a fluid delivery device including a tubular barrel having a barrel outlet in fluid communication with said chamber inlet, a plunger located within said barrel manually movable from a first position within said barrel to a second position toward said barrel outlet, thereby compressing fluid within said barrel at said barrel outlet and said barrel and said plunger including cooperative stop members retaining said plunger in said barrel when said plunger is moved in said barrel to generate a fluid pressure within said barrel at said barrel outlet;

a valve located between said barrel outlet and said chamber inlet having a valve inlet in fluid communication with said barrel outlet and a valve outlet in fluid communication with said chamber inlet; and

a stop member fixing said plunger in said barrel at said second position;

whereby movement of said plunger from said first position to said second position compresses fluid in said barrel at said barrel outlet and opening of said valve

delivers fluid under pressure to said chamber inlet, and expressing said medicament through said chamber outlet.

16. The medicament delivery device as defined in Claim 15, wherein said medicament in said passage is a powdered medicament.

17. The medicament delivery device as defined in Claim 15, wherein said medicament in said passage is a liquid medicament.

18. The medicament delivery device as defined in Claim 15 further comprising a penetration member, wherein said breaching of said membranes is by application of said penetration member, wherein said penetration member breaches said membranes.

19. The medicament delivery device as defined in Claim 18 wherein said penetration member is a portion of said valve.

20. The medicament delivery device as defined in Claim 15, wherein said medicament dosing member is movable toward said fluid delivery device to open said valve.

21. The medicament delivery device as defined in Claim 20 further comprising a penetration member which is a portion of said valve, wherein said breaching of said membranes is by application of said penetration member, and said penetration member breaches said membranes.

22. A method of delivering a medicament to a patient utilizing a medicament delivery device including a manually actuatable fluid delivery device having an outlet, a medicament housing including a medicament therein having an inlet in fluid communication with said outlet of said manually actuatable fluid delivery device and an outlet, membranes opening at a pressure of less than 10 atmospheres sealing said inlet

and said outlet of said medicament housing, and a manually actuatable valve located between said inlet of said medicament housing and said outlet of said manually actuatable fluid delivery device, said method comprising: manually actuating said manually actuatable fluid delivery device to deliver fluid under pressure to said outlet of said fluid delivery device, applying said outlet of said medicament housing to the patient, manually opening said manually actuatable valve to deliver fluid under pressure to said inlet of said medicament housing, opening said membranes and delivering said medicament through said outlet of said medicament housing to the patient.

23. The method of delivering a medicament to a patient as defined in Claim 22, wherein said membranes are burstable at a pressure of less than 5 atmospheres, said method including opening said manually actuatable valve to deliver fluid under pressure to said inlet of said medicament housing to rupture said burstable membranes.

24. The method of delivering a medicament to a patient as defined in Claim 22, wherein said manually actuatable fluid delivery device includes a tubular pressure member having an outlet and a stopper received in said tubular pressure member, said method including moving said stopper toward said outlet of said tubular pressure member to deliver fluid under pressure to said outlet of said tubular pressure member.

25. The method of delivering a medicament to a patient as defined in Claim 24, wherein said method includes fixing said stopper in said tubular pressure member after delivering fluid under pressure to said outlet of said tubular pressure member and prior to applying said outlet of said medicament housing to the patient.